

**WHAT IS CLAIMED IS:**

1. An acceleration control device including means for calculating an aimed accelerator opening  $A_c$  on a basis of an information of a displacement amount  $A_m$  of an accelerator pedal and a vehicle speed  $V$  and means for outputting a control signal such that a difference  $\Delta$  of an accelerator opening

$$\Delta = A_m - A_c$$

- approaches zero, comprising actuation means (1) for automatically starting a calculation of the aimed accelerator opening  $A_c$  when a usual running state of a vehicle is detected on the basis of an information including the vehicle speed  $V$ .

2. The acceleration control device as claimed in claim 1, further comprising calculation means (2, 3, 4, 5 and 6) for calculating the aimed accelerator opening  $A_c$  by using a speed difference  $\delta$  between a virtual aimed speed  $V_t$  and the vehicle speed  $V$ .

$$\delta = V_t - V$$

- by sequentially setting the virtual aimed vehicle speed  $V_t$  for every small range of change on the basis of the difference  $\Delta$  of the accelerator opening and the vehicle speed  $V$ .

3. The acceleration control device as claimed in claim 2, wherein an input information of said actuation means (1) for detecting the usual running state of said vehicle includes, in addition to the vehicle speed  $V$ , the displacement amount  $A_m$ , a fuel flow rate  $F$  and a gear position  $T_m$ .

4. The acceleration control device as claimed in claim 3, wherein said calculation means (2, 3, 4, 5, 6) comprises accelerator opening difference detection means (2) for identifying the difference  $\Delta$  of the accelerator opening, an aimed acceleration calculating means (3) for obtaining an aimed acceleration  $\alpha_t$  from an output of said accelerator opening difference detection means (2), virtual aimed vehicle speed calculation means (4)

- for obtaining the virtual aimed vehicle speed  $V_t$  from the aimed acceleration  $\alpha t$  and an initial vehicle speed  $V_0$  at an actuation time detected by said actuation means (1), speed difference calculation means (5) for obtaining the speed difference  $\delta$  from the virtual aimed vehicle speed  $V_t$  and the vehicle speed  $V$  and auto-cruising control means (6) for
- 5 calculating the aimed accelerator opening  $A_c$  from the speed difference  $\delta$  and the initial accelerator opening  $A_0$  generated by said actuation means (1).
5. The acceleration control device as claimed in claim 4, wherein said actuation means (1) includes means for generating, as a signal for automatically actuating the calculation
- 10 control, the initial vehicle speed  $V_0$  and the accelerator opening  $A_0$  at that time.
6. The acceleration control device as claimed in claim 4, wherein said acceleration opening difference detection means (2) has a dead zone in a portion in the vicinity of the difference  $\Delta$  of the accelerator opening, in which the difference  $\Delta$  is zero, the difference  $\Delta$
- 15 of the accelerator opening in the dead zone being outputted by said acceleration opening difference detection means as always zero.
7. The acceleration control device as claimed in claim 4, wherein said aimed acceleration calculation means (3) includes a function  $\alpha t = (\Delta, V_t)$  map having the
- 20 difference  $\Delta$  of the accelerator opening and the virtual aimed vehicle speed  $V_t$  as variables.
8. The acceleration control device as claimed in claim 4, wherein said virtual aimed vehicle speed calculation means (4) includes means for calculating the virtual aimed vehicle speed  $V_t$  by integrating and adding the aimed acceleration  $\alpha t$  obtained from said
- 25 aimed acceleration calculation means (3) to the initial vehicle speed  $V_0$  every certain time.
9. The acceleration control device as claimed in claim 4, wherein the speed difference  $\delta$  is feedback to said aimed acceleration calculation means (3).

10. The acceleration control device as claimed in claim 9, wherein said aimed acceleration calculation means (3) includes means for restricting a transmission of a new aimed acceleration to a limited value when the speed difference  $\delta$  is larger than a predetermined value.

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11. The acceleration control device as claimed in claim 9, wherein said aimed acceleration calculation means (3) includes means for inhibiting a transmission of a new aimed acceleration when the speed difference  $\delta$  is negative.

10 12. The acceleration control device as claimed in claim 4, further comprising means for temporarily inhibiting the control of said auto-cruising control means (6), when the difference  $\Delta$  of the accelerator opening has a negative value over a negative side predetermined value, and inputting the accelerator pedal displacement information  $A_m$  or a regular function thereof as an acceleration input of an engine.

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13. The acceleration control device as claimed in claim 12, wherein the negative side predetermined value is set to a value equal to a lower limit of the dead zone defined in claim 6.

20 14. The acceleration control device as claimed in claim 12, further comprising means for automatically actuating said actuation means (1) when an absolute value of the difference of accelerator opening becomes smaller than a predetermined value in the state where the control is temporarily inhibited.

25 15. The acceleration control device as claimed in claim 4, further comprising means for temporarily inhibiting the control of said auto-cruising control means (6) in a state where a specific operation is performed by a driver and inputting the accelerator pedal displacement information  $A_m$  or a regular function thereof as an acceleration input of an

engine.

16. The acceleration control device as claimed in claim 15, wherein the specific operation includes an operation of a direction indicator and a stepping of the accelerator pedal deeper than a predetermined value.

17. The acceleration control device as claimed in claim 15, further comprising means for automatically actuating said actuation means (1) when the temporary inhibition of the control is released.

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18. The acceleration control device as claimed in claim 15, further comprising means for automatically actuating said actuation means (1) when the running state of said vehicle is under a predetermined condition in the state where the control is temporarily inhibited.

15 19. The acceleration control device as claimed in claim 7, wherein said aimed acceleration calculation means (3) includes means for taking in the accelerator pedal displacement information  $A_m$  as the input information and means for temporarily changing said map when a state in which the accelerator pedal displacement information  $A_m$  is larger than a predetermined value continues for a time longer than a predetermined time to generate a larger aimed acceleration  $a_t$ .

20. The acceleration control device as claimed in claim 4, wherein said auto-cruising control means (6) includes means for taking in the accelerator pedal displacement information  $A_m$  and means for temporarily increasing a control gain when a time-differentiated value of the accelerator pedal displacement information  $A_m$  exceeds a positive side predetermined value.

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21. A control method of an acceleration control device provided in a path for

transmitting an output of an acceleration sensor for detecting a displacement of an accelerator pedal to an actuator for controlling an accelerator opening of an engine, wherein an auto-cruising control is automatically actuated with using a vehicle speed when an actuation condition including a condition, in which a change of vehicle speed is in a predetermined range for a predetermined time, is established as an aimed vehicle speed to  
5 be controlled.

22. The control method of an acceleration control device, as claimed in claim 21, wherein, when the accelerator pedal is displaced substantially in a state where the  
10 auto-cruising control is actuated, the vehicle speed is increased by sequentially updating the aimed vehicle speed every small change of the vehicle speed.

23. The control method of an acceleration control device, as claimed in claim 22, wherein, when the accelerator pedal is released in a state where the auto-cruising control is  
15 actuated, the vehicle speed is abruptly reduced to an aimed value by setting the aimed vehicle speed correspondingly to a displacement of the accelerator pedal.